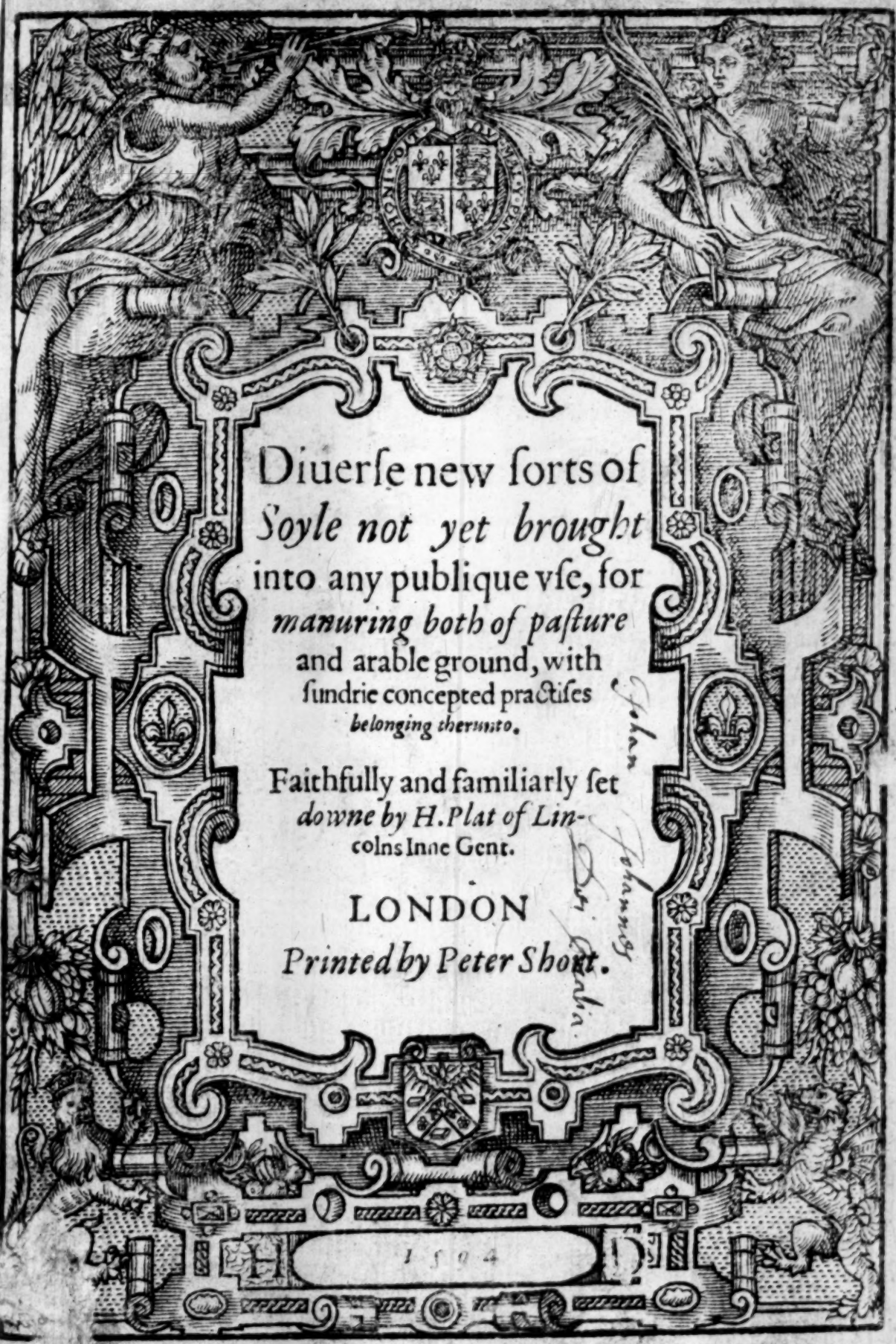

Diuerſe new ſorts of *Soyle not yet brought* into any publique vſe, for *manuring both of paſture* and arable ground, with ſundrie concepted practiſes *belonging thereunto.*

Faithfully and familiarly ſet *downe by H. Plat of Lin-*coln's Inne Gent.

LONDON

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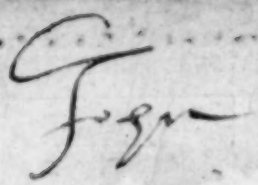
1594



A Philoſophicall diſcourſe as well vpon the Common, as vpon the vegetatiue and fructifying Salt of Nature.

HAuing found by ſundrie obſeruations, drawn from experience her ſelfe the vndoubted mother of all true and certaine knowledge, that all ſorts, and kindes of Marle, or ſoyle whatſoeuer, either knowne or vſed alreadie for the manuring, or bettering of all hungry and barren grounds, or as yet concealed, and kept in the boſome of Nature, from the common and vulgar ſort of people: do draw their generatiue and fructifying vertue from that vegetable ſalt (which M. *Bernhard Paliſſy* in his learned and philoſophicall treatiſe, *de la nature des eaux, & fonteines*, dooth ſo often tearme by the name of a fift element, whereon all our auncient Philoſophers did ſcarcely dreame) I haue thought good, becauſe *I* would not ſeeme fantaſticall, and ouerweening in mine owne conceite, as if I were the firſt broacher of this opinion: before I proceede to anie practicall diſcoueries herein, firſt to ſet downe that ſhort & ſweet diſcourſe of *Franciſcus Valetius* in his booke *de ſacra Philoſophia, cap. 34.* vpon the miracle contained in the fourth booke of the kings and ſecond Chapter, and then to amplifie the ſame by ſome of thoſe manifeſt experiments which are common in this land alreadie, and by ſome others of more value, and yet of leſſe charge, although as yet not knowne, or at the leaſt not publiſhed by any former Authour.

In the fourth Booke of Kinges, and ſecond chapter. 19, 20, 21, and 22. verſe, it is thus written. And the men of the Citie (that is of Hierico) ſaide vnto Eliſha, Beholde ſir, the dwelling of this Citie is pleaſaunt as thou thy ſelfe ſeeſt: but the Water is naught, and the grounde barren. Hee ſaide bring mee a newe Cruſe, and put ſalt therein. And they brought it him. And hee went vnto the Spring of Waters, and caſt the ſalt therein, and ſayde, thus ſayeth the Lorde, I haue healed theſe waters: there ſhall not come hence foorth either death, or barrenneſſe. So the Waters were healed vnto this day according to the ſaying of Eliſha which he ſpake.

Wherevpon Valetius entreateth in this maner. There is no doubt but that this, as alſo diuerſe other ſignes, and tokens were ſhewed vnto the people of Iſrael by way of figure, as Saint Paule dooth teſtifie, and that the ſame dooth ſignifie ſome other purifying, and cleanſing of waters, and that it was done in token of ſome Sacrament. But whether there bee anie regarde to bee had of Nature in this myracle or no, wee are at this preſent to conſider, and examine. For I haue oftentimes obſerued euen in the perfourming of myracles, that for the moſt part, it pleaſeth God to vſe ſome naturall cauſe, and that vppon manie, and excellent reaſons him moouing thereunto. Wherefore ſeeing the barrenneſſe of the earth is cured by the Waters, it is manifeſt that there is nothing elſe meant in this place, but that the Waters were of ſuch kinde, and qualitie, as that the earth beeing watered therewith, became barren by their corruption. And it ſeemeth by al probabilitie that this fault was in their ſaltneſſe, both

becauſe

becauſe it is an ordinarie accident to many waters, whereby they are made vnholſome to be drunk, and becauſe that, of all other thinges doeth moſt of all make the earth vnfruitful; whereupon it grew into a cuſtome with our auncient forefathers, that all ſuch ground as became forfeit and confiſcate vnto the Crowne, by reaſon of any high and capitall offence committed, ſhould be ploughed and ſowed with ſalt, which we read to haue beene doone by *Abimelech*, in the ninth Chapter of the booke of Iudges, when he had deſtroyed the cittie of the Sichemites, and in the Pſalme it is ſaid: He hath deſtroyed a fruitful land with ſaltneſſe, for the wickedneſſe of the inhabitants. And therfore ſaltneſſe is a principall meanes to make the ground vnfruitfull, and the ſowing of ſalt thereon bringeth forth barrenneſſe, and a curſe vpon it. But how then commeth it to paſſe, that if the waters of Iericho, did hereby both become vnſauorie for the people to drinke, and vnprofitable for the encreaſe of the earth: that there ſhould be any naturall vertue in ſalt, to helpe and ſweeten them, eſpeciallie when S. Iames ſaith in his Epiſtle and third chapter. My brethren, can the fig tree bring forth grapes, or the vine bring forth figs? So neither by the ſame reaſon, can ſalt make waters to be freſh & ſweet. Neither can it bee denied, but that as contraries are remedied by their contraries: ſo likewiſe that the faults of al things are increaſed by their like and ſemblable Natures. Therefore one of theſe two muſt of neceſsity fal out, that either in the myracle of *Eliſha*, there was no regard had of nature at al, but that there was a meere contrarie courſe to nature vſed, thereby to make the myracle the greater (for we read of ỹ like often in the holie Scriptures) or elſe that the fault of theſe waters

was not in their saltnesse, but rather in some other rotten and putrified corruption, which as in all other things; so in water most especially is corrected by the addition, and mixture of salt. For salt beeing of an hot and drie nature, and by solution being verie apt to incorporate therewith, consumeth all the putrified vapors, or partes thereof, and correcteth all the putrifaction which it findeth, and it maketh all good Waters to keepe sweet and sounde the longer. For the Marriners themselues can witnesse, that such waters as be somwhat brackish, be the best for long voiages, because they will last longer than others: and therfore they do often water their ships from springs that bee neere the sea. And furthermore those that doe search more narrowlie into the nature and property of all things, doe constantlie affirme, that such springes as be offensiue in smel, or that carry any bad or corrupt tast with them, are no waie better to bee purified & clensed, then by casting of salt into them. Therefore this seemeth verie probable for that (besides all which *I* haue alreadie alledged) waters doo become most deadlie and contagious, by their putrified and offensiue smels, rather than by their saltnes. Yea the saltnesse of the waters (vnlesse it be extream, as in the Sea of Sodome, which for that it engendreth no liue thing, and also destroyeth whatsoeuer falleth into it, it is called by the name of the dead sea) doth neither tend to destruction, neither is it offensiue to the fertilitie of the ground (but rather beeing meanely brackish, and thereby also it selfe not subiect to putrifaction, as wee may behold in the sea) it maketh the waters themselues most fruitfull. Neither is there any place in the whole world where that generatiue vertue doth more abound, or where there is

more

more infinit generation & multiplicatiō of creatures, then in the wide Ocean. And I doo verely beleeue ẏ the ſpirit of God which in the beginning did ſpread it ſelfe vpon the waters (which I doe hold to be a certen fire) did make them to be of that nature, that is to ſay, thicke and ſalt, and by that reaſon they are much more apt for the generation of all creatures, then any freſh waters whatſoeuer. Now then euery kind of ſaltwater is not hurtful to plants, neither is it hurtfull to al alike, but there be certen plantes which proſper beſt in ſaltwaters, & thoſe ſprings, which be ſomwhat brackiſh are rather vnfit to make drinke for mans body, then to water the grounds. For nothing is more vnſauory in our drink then ſalt, becauſe that our thirſt doth naturallie deſire to bee ſatisfied with that which is cold and moiſt, wheras theſe watering dewes doe rather repreſent a food, then a bare drinke to ẏ earth, for they giue a kind of noriſhment vnto plantes, neither do they offēd vnles they be ouerſalted like brine. So that according to the meaſure of ſaltneſſe, theſe brackiſh waters be either good or hurtful to al kind of vegetables: for if they ſauour of the exceſſe then they burn, and dry vp the ground, and ſo make it barren, but if they bee moderatelie ſalt they agree well with diuers plantes, and bee not verie hurtfull vnto any.

So likewiſe all other liuing Creatures by the extreamitie of ſaltneſſe are deſtroyed vtterlie, as wee ſee by the Redde Sea, for they are euen partched awaie therewith, but if that the ſame bee more temperate (as in all other Seas) many Creatures are ingendered thereby, and doe growe into huge and mightie bodies, and bee more ſounde then any other Creatures, and many of them beeing dead,

may

may bee kept a long time, although I am not ignoraunt, that some kindes of fishes cannot endure the least saltnesse that may be, neither can they continue, or liue but in the fresh water onely, and some others againe doo thriue and prosper in either of them: such is the great varietie of natures. But vnto man, and to diuers other land Creatures, the eating of much salt is very contagious, because it maketh the bloud salt, and it breedes barennesse to mans bodie by the extreame siccitie thereof, and it maketh our seed or nature too sharpe, but the same being moderatly taken, is very stirring in our bodies, and prouoketh them to venerious actes, whereby it helpeth to the generation of mankind.

And therefore me thinks, that al those controuersies about the seueral natures of salt, are but friuolous wherein some doo contend that it engendereth barrennesse, and death, and therefore it was vsed to bee throwne vpon curssed groundes, and others woulde haue the same to be of a fruitful and incorrupt nature, which made the Poets to faine, that Venus was born in the sea, by meanes of the sperme of the Gods that fel into it, and so they called hir ἀφροδίτην of the fome or froath of the sea. And here by the waie I wil make bold also, to insert the opinion of that learned, and great Magitian *Io. Bap. Por. 347.* who writing vpon the helpes of conception saith, that salt doth greatlie further procreation, for it doth not onely stir vp lust, but it doth also minister fruitfulnesse. And therefore the Egyptians did vse to feed their bitches with salte meates, when they found them vnapt for generation. And Plutarch doth witnesse, that ships vpon the seas are pestred and poisoned oftetimes, with exceeding store of mice. And some hold opinion, that the

females

females without any copulation with the males, doe conceiue onely by licking of salt. And this maketh the Fishmongers Wiues so wanton, and so beautifull. Which caused the Egyptian priests (by the report of Plutarch) most religiously to abstaine from salt, and salt meates, for that they found them verie stirring, and prouoking to venerie. Wherefore since the nature of salt is to defend and take away all putrifaction, which leadeth euery thing vnto destruction, it seemeth vpon good reason that this was the salt of the waters of Iericho, and that *Elisha* did hold a naturall course in correcting of them: God himselfe exalting aboue nature that naturall propertie which hee had first giuen vnto salt: For otherwise, neyther so small a proportion of salt, woulde haue sufficed to haue purified so great a quantitie of Waters, neither could these waters haue lasted sweet vntill this daie. Thus farre *Valetius*.

Nowe that we may yet haue a farther, and more inward speculation into the nature of salt, it shall not be impertinent to our purpose, to set downe and gather, all those obseruations, which I haue also culled and gathered out of twoe larger Treatises, the same being euen wrung out of the bowels of the earth, by that learned husbandman, maister *Bernard Palissy*, whereof the one is entituled, *Des sels diuerses*, and the other *De la marne*, wherby all those that be ỹ true infantes of Art, may receiue a full light into nature, which dooth heere present hir selfe in all hir royaltie, with her *Cornucopia* in her hande, and the ignoraunt Farmers may also gleane with them, a fewe lose and scattered eares, to make so much breade of, as may relieue their hungrie bellyes. And hauing performed this collection, I will sette downe such particu-

ler practises, as haue their full warrant from these two Theorickes, and may serue in diuers partes of this land, either for arable or pasture groundes, where the ordinarie soile or dung doth faile vs.

A philosophicall discours vpon salt.

There are so manie sortes and kindes of salt (saieth Maister *Bernard*) that it is impossible for any man to number them all, and farther I tell thee that there is not any one thinge in the worlde, which dooeth not participate of this salt, whether it be man, beast, tree, plant, or any other kinde of vegetable, yea euen the mettals themselues, and that which is more, there is not any kind of vegetable whatsoeuer, that coulde growe or flourishe, without the action of salt, which lieth hidde in euerie seede, and besides all this, if the salt were deuided from the bodie of any liuing man, or from the stones which are wrought vppe into strong buildinges, or from the principall postes, the Rafters, and the beames of any house, they woulde all fall to powder, in lesse than the twinkeling of an eie. The like may bee said, both of yron, steele, gold and siluer, and all other mettals. And therefore hee that woulde knowe of mee howe many kindes of salte there bee, I shall bee forced to answer him that there be as many, as there be seuerall sortes of tastes, or sents.

Diuersitie of salts.

Coppres is a salt, Niter is a salt, vitrial is a salt, allom is a salt, Borras is a salt, Suger is a salt, Sublimate is a salt, Saltpeter is a salt, the salt gem, *Le Salicor*, the Tartar, sal Armoniacke, all these are diuers kindes of saltes, and if I would take vppon me to name them all, I shoulde neuer make an ende. The salt which the Alcumistes call *Sal Alcali*, is extracted from an herbe, which groweth in the salt marishes of the

Isles

Isles of *Xantoigne*. The salt of Tartar, is nothing els, then that salt of the reasons which giueth the taste and sauour to the Wine, and defendeth it from putrifaction, and therefore I say yet againe, that the sauour of all things proceedeth from salt: which alone causeth the vegetation, perfection, maturitie, and the whole good that is conteined in euery thing that nourisheth.

And although there bee diuers sortes of these and other vegetables, whose saltes be more fixed and of harder solution, than the salt of the Vine, *& du salicor*, neuertheless I say, that in all manner of Trees, and plantes, there is more or lesse of this salt, *videlicet*, so much as is sufficient for them: aswell as in those others before mentioned, for otherwise manie kindes of Ashes woulde not serue to whiten linnen cloathes: by the effect of which ashes thou mayest easilie vnderstand that there is salt in all thinges. And thou art not to thinke, that the ashes bee of strength to whiten, but onelie by the vertue of their salt, for otherwise the selfe-same ashes might serue diuerse times. The properties of salt. Salt the strength of ashes.

But in so much as the salt which is within the saide ashes, commeth to bee dissolued in the water, wherin they boile, it penetrateth the linnen, and by his vertue sharpenesse, and biting, all the filthe and soile of Cloth is dispearsed, mollified, and carryed downewarde with the Water, which afterwardes becommeth a Lee, because that therein resteth and remayneth all such salt as was in the ashes before, beeing now dissolued by the action of the water, and the ashes by this meanes hauing lost their saltnesse, haue not any more strength to whighten anye

other linnen, and men cast them out into the streetes as altogither vnprofitable. Marke yet one other example. When the salt-peter-men seeke to drawe out the salt peter from the earth, they worke in the same manner as is before set downe for the making of the Lee, and when they haue gotten out the salt peter, both the ashes and the earth, out of which they haue now taken the salt, are altogither vnprofitable: for that there is no more salt leste which was the principall worker.

And yet for thy better instruction, consider those men which tan the hides of beasts, they take y barkes of Oake, and hauing dried and broken them, they lay them amongest the hides in their tanning fats: and when the hides haue remained their full time with those barkes, they cast them awaie as a thinge of no further vse (although I knowe that in diuers places where fewell is deere, they vse to make cloddes, or turfs of them, in the likenesse and forme of cheeses, which they cause to be dried, and so burne them for want of other fiering) but the ashes of them are nothing woorth, because the salt of them is already spent.

Dooest thou not vnderstand heereby, that it is not the barke, that hath hardned and tanned the leather, but the salt which is conteined therein? For otherwise the same barkes woulde serue againe, but because the salt is dissolued it is soaked into the Leather, by reasonne of his moysture, which hath made an attraction thereof to serue his own turne. It is also to bee noted that in al kinde of woodes, the salt is in a manner wholelie in the barkes, and that such wood as is barked dooeth neuer yeelde any strong ashes. Mounsieur Sisly Duke Mountpen-

sier

ſier his Phiſition ſhewed vnto mee vppon a certaine time a ſticke of Sinamon, which was about foure foote in length, and an inch thicke. I taſted of the vttermoſt barke thereof, and it had the liuely, and naturall ſauour of the beſt and ſtrongeſt Cinamon, whereas in al the reſt of the ſticke, there was no more taſte then in a ſtone. And this is the reaſon why the Tanners account of nothing elſe but the barkes, becauſe of the ſalt which is in them, for otherwiſe the reſt of the wood being wrought into powder, might ſerue their turne as well. And for further proofe that there is ſome ſalt in euerie thing, we read that the Egyptians were woont to vſe Niter, and other Aromaticall bodies, about the dead bodies of their kings, and princes, which wee doe call enbawming: which Niter is a preſeruing ſalt, that defendeth from putrifaction. And their fleſh ſo embaulmed is called *Mumia*, which the Egyptians doe finde to bee verie medicinable, and for my part I thinke the ſame more wholſome then potable golde. There be ſome in our time that woulde faine imitate that ancient manner of enbaulming, and ſeeke to make a kinde of *Mumia* of their bodies who haue ſuffered death for ſome capitall offence, but they faile herein, and their *Mumia* doth ſoone corrupt, and putrifie, for want of ſuch excellent Aromaticall drugges as thoſe ancient Egyptians vſed. For now it is generally holden, that all thoſe ſweet ſmelling ſimples, all the Rubarbe, Gums, and other Aromaticall ware, are greatly ſophiſticated before they come to our handes, and our common ſalt is not of that vertue to preſerue things withall, as thoſe aromaticall drugges which come from the bleſſed Arabia, and other hote Countryes. And that euerie thing hath ſome ſalt in it, it is manifeſt,

Glasse of all kinds of ashes

feſt, for that it is poſſible to make Glaſſe of all kinds of Aſhes, although ſome ſortes of them bee of harder fuſion or melting than others. And were there not ſome ſalt in all trees and hearbes, it woulde bee a thing moſt impoſſible to make Glaſſe of them. The ſecrete vertues alſo which lie hid in ſalt confirme the ſame. For ſalt whiteneth all thinges, it hardeneth all things, it preſerueth all things, it giueth ſauour to all things, it is that Maſticke that gleweth all things together, it gathereth and knitteth all mineall matters, and of manie thouſand peeces it maketh one maſſe. This ſalt giueth ſounde to all thinges, and without the ſounde no mettall will ring in his ſhirle voyce. Salt maketh men merrie, it whiteneth the fleſh, and it giueth beautie to all reaſonable creatures, it entertayneth that loue and amitie which is betwixt the Male and Female, through that great vigour and ſtirring vppe which it prouoketh in the engendring members, it helpeth to procreation, it giueth vnto creatures their voyce, as alſo vnto Mettalles. Salt is the cauſe that manie ſmall pibble-ſtones beeing ſubtlelie powdred, become one maſſe, whereof they make our drinking Glaſſes, and all other ſortes of Table-veſſell, and by the power of ſalt, all ſubſtaunces maie bee brought into tranſparent bodyes. And it is ſalt that maketh all ſeedes to flouriſh, and growe, and although the number of thoſe men is verie ſmall, which can giue anie true reaſon whie dungue ſhoulde doe anie good in arable groundes, but are ledde thereto more by cuſtome than anie Philoſophicall reaſon, neuertheleſſe it is apparaunt, that no dungue, which is layde vppon barraine groundes, coulde anie way enrich the ſame, if it were not for the ſalt which the ſtrawe

The vertue of Salt.

and

and hay left behinde them by their putrifaction. And therfore al theſe ſimple ſots which leaue their muck-heaps abroad, and ſubiect to the weather, ſhew themſelues to bee but meane husband men, and that they neuer taſted of any true naturall philoſophie. For the raine which falleth vpon theſe dungue-hils, flowing downewarde into the vallyes, dooth alſo carrie with it the ſalt of the dungue which diſſolueth it ſelfe with the moyſture: whereby the ſoyle beeing afterwarde laide abroad vpon the land, dooth little or no good vnto it. But if thou wilt not giue credite vnto my ſpeech, yet marke howe the labouring Hinde, when hee carryeth his dungue to the feelde, howe in diſcharging of his loades hee leaueth it in certane heapes together, and a while after hee commeth to ſpread it all ouer the ground, and layeth the ſame in equall leuill, and afterward when the ſame feeld happeneth to bee ſowed with corne, thou ſhalt alwayes finde the corne to be more greene and ranke in thoſe places where the ſame heapes were firſt layde (after they haue lien there ſome reaſonable time) then in anie other place in all the ground beſides, and this commeth to paſſe by reaſon that the raine which fell vppon them, hath caried euen the ſalt through them, and conueied it into the earth that was vnder them. Wherby thou maiſt eaſily gather that it is not the dung it ſelfe which cauſeth fruitfulnes: but the ſalt which the ſeed hath ſucked out of the ground. And herevpon it commeth to paſſe that all excrements as wel of man as beaſt, ſerue to fatten & inrich the earth. But if any man will plow, and ſow his ground yearely without dunging the ſame, the hungry ſeede in time will drinke vp all the ſalt of the earth, whereby the earth being robd of her ſalt, can bring forth no more fruit,

muckheaps ought to be couered.

All excrements enrich ground

fruit, vntill it bee dunged againe, or suffered to lie fallow a certaine time: to the ende that it may gather a newe saltnesse from the cloudes, and raine that falleth vpon it. But I speake not here of common salt, but of the vegetatiue salt. For there bee many that hold opinion, that there is no greater enemie to all seeds then salt, and that because in ancient time when any wicked, or desperate villain had committed any notorious crime that deserued death, hee had sentence giuen him to haue his house raced, his ground turned vp, and sowed with salt, that it might neuer after bring forth fruit againe. I know not whether there bee any Countrie whose salt dooth not agree with corne: but I am sure that vpon the little hillockes in the salt Marshes of *Xantoigne*, men doe mow as good grasse as in anie other place that euer I came in. And those hillockes doe come of the groundes and washinges throwne vp from the bottome of the same Marshes, which are as brackish as the sea water, and yet neuertheless I did neuer see any fayrer corne in my life then groweth in them. And therefore I know not why our Iudges haue taken occasion to sowe salt on the offenders groundes, to bring a curse vppon them, vnlesse there happen to bee some such Countrie where salt is the meere enemie of all seedes. But to continue our first course, and to proue that salt is no enemie, either to the vegetatiue, or sensatiue natures. We see that the Vines of the countrie of *Xantoigne* which are planted in the midst of the salt marshes, doe bring forth a kinde of blacke reason, which they call *Chanchets*, and wherof there is a wine made that is nothing inferiour to our Hipocras, in which they vse also to dippe their toasted bread, as they doe in Ypocras. And these Vines are so fertile that one

plant

plant of them dooth bring foorth more fruite, then ſixe of thoſe that growe in Paris. See nowe what reaſon I haue to thinke that ſalt is ſo farre off from beeing an enemie to Nature, that on the other ſide it doth rather helpe the goodneſſe, ſweetneſſe, maturitie, generation, and preſeruation of the ſaid Vines. And not onely ſalt dooth giue his ayde, and helpe herein, but alſo the ayre it ſelfe, by his ſalt exhalations. In the aforeſayde Iſlandes, and within the ſalt Marſhes, there is a ſalt hearbe founde called *Salicor*, whereof the moſt beautifull Glaſſe of all other is made, and there is alſo gathered that *Xantonique* Wormewood, ſo called of the Countrey where it groweth. The ſame hearb hath this propertie, that if one doe boyle the ſame, and with the decoction thereof doe temper a little meale, and make it into paſte, and ſo frie the ſame either in larde or Butter, and eate thereof, it will expell, and driue out all ſuch Wormes, as are either within the bodies of men, or children. And before I vnderſtood thereof, I had ſix children that died of the Wormes which I did manifeſtly perceiue as well in the anatomizing of their bodies, as alſo for that oftentimes they voyded them at their mouthes, and when they were drawing to their ende, theſe Wormes woulde iſſue at their noſthrils. My purpoſe is not hereby to proue that common ſalt doth agree with all kinde of plants, but I am well aſſured that the ſalt Marſhes of *Xantoigne*, doe bring foorth all maner of fruites that are planted there, and the ſame ſo pleaſaunt, as in no place more where I haue trauayled.

All wilde hearbes, thornes, and thiſtles, doe proſper ſo exceedingly there, as no where better, which is a ſufficient confutation to thoſe which would haue

ſalt to be enemie to all plants. For if it were an enemie to plants, it ſhould alſo bee an enemie to the nature of man, which the Burgonions will by no meanes confeſſe, for if they were ſo perſwaded, they woulde neuer haue ordained that ſalt ſhoulde bee put in the mouthes of their infants at their baptiſme, wherevpon they are tearmed the powdred Burgonions. Neither will the beaſtes agree that ſalt is an enemie vnto them, for the Goates will deuoure as much thereof, as you will giue them, and they ſeeke out purpoſely for briniſh walles, agaynſt the which men haue made water, euen to licke them. And the Pigeons when they happen to find an olde wall whoſe temper was made of Lime and Sand, and beginneth once to molder away, they will neuer leaue it, nor bee driuen from it.

Now ſome ſimple Clowne that neuer knew what learning ment, will perhaps imagine, that they feede vpon the ſande, but that is but a blind conceipt, for it is not digeſtible, whereas this is the verie potable Golde of the Pigeons, and therefore wee are not to thinke that they ſeeke for ought elſe then the Lime that is in the morter, and that for the ſaltneſſe thereof. And if they happen to ſwallow one graine of ſand, it is againſt their willes.

The Oiſters for the moſt part are alſo nouriſhed by ſalt, and their ſhels are compounded of it which they themſelues haue wrought vp, and it is very apparant that it is ſo, for that their ſhels being caſt into the fire, do make a crackling much like to common ſalt. And if ſalt bee of that vertue as to woorke an erection of thoſe engendring parts (as I haue ſaid before) it is a thing moſt certaine and well approoued, that Oiſters themſelues are of the ſame operation: which approueth

A bad argument & worſe framed.

ueth my former allegation, that thoſe Oyſters are for the moſt part nouriſhed with ſalt. But for a further confirmation, that ſalt is not enemie to anie vegetatiue nature, let vs a little behold the worke of the plaine countrimen of *Ardenna*, in diuers places wherof they cut down woods in great quantitie, and thoſe they couch & range in the earth in ſuch ſort, as that there may be drawne vnto them ſome aire from belowe, then they lay great number of cloddes of earth vpon the ſame wood, yet ſuch as are full of ſwarth, and graſſe, and afterwardes they kindle the Wood which lyeth thus couered with the turfe, and after they haue burned them all togither ſufficiently, they diſperſe them ouer the face of the whole ground, as wee vſe to doe in our dongue, then they plough it, and ſowe Rie there, where nothing elſe but Wood grew before, and the Rie commeth vp aboundantly, and this they do euerie ſixteene yeares. And in ſome partes but ſixe yeres, and in ſome parts but four yeres onely, wherby the ground being ſpared ſo long, bringeth foorth afreſh as much wood, and as great as at the firſt. And of this wood they fell ſo much as is ſufficient to enrich the ground for one yeares crop, and burne the ſame with their turfes together as before: and ſo conſequently euery yeere vntill the number of ſixteen yeeres be expired, and then they begin again at the firſt peece of ground which they had ploughed 16 yeeres before, in the which they find the wood of as great a growth as in the beginning. Hereby it is manifeſt, that the ruſticall opinion of thoſe clowniſh people of that Countrey is vtterly falſe, who thinke that the heate of theſe fires, and the aſhes, are the onelie cauſe which maketh their cold countries fruitfull, whereas in deede it is the ſalt of theſe trees,

hearbs,and rootes being burnt which they haue left behinde them. And therefore if my wittes were able to ſearch into all the vertues, and properties of ſalt,I would thinke to doe wonders therby. For euen the *Alcumiſts* giue a blauncher vnto Venus with the ſalt of Tartar, or ſome other kind of ſalt. And ſalt is a moſt neceſſarie thing for the Diers, becauſe that Alom which is a ſalt,draweth vnto it the colors of Braſill,and of Galles,and of other matters,and ſo maketh both cloth, ſilke and leather, to take their die the better, inſomuch as the Diers when they woulde die a white cloath into a redde, are ſometimes forced to dippe it firſt in Alome water. Yea, and ſome kindes of ſalt doe ſo harden yron, and doe giue ſuch temper to the edges of weapons, as that one may cut yron with them as if it were but a peece of wood. What ſhoulde I ſay any more of this ſalt, for it paſſeth my reach to make anie true deſcription of the excellent vertues thereof? Onely I will conclude with this, that if it were poſſible to keepe the ſame from moyſture, then diuerſe ſubiectes wherein it is included woulde laſt for euer, and ſo the ſalt that is in Wood, would defende the ſame from all putrifaction, and if all humiditie might bee defended from entring into a peece of Wood, there would neuer any Wormes breed or engender in the ſame, for it is impoſſible that anie putrifaction ſhoulde beginne, vnleſſe ſome moiſture be firſt kindled by way of putrefaction. Thus much out of the firſt treatiſe.

Nowe I will take out a few of the moſt principall notes out of his large diſcourſe vppon the title of Marle,and ſo proceed from theſe French Theoricks, to ſome Engliſh practiſes.

Marle, ſaith Maſter Barnard, is commonly a white earth

earth which men digge out from vnder the ground, and for the moſt part they are forced to make pits, in ſuch ſort, as they doe for wels before they can come at it, and where they find any ſtore thereof, they laie the ſame vppon their hungrie and barren groundes, firſt in ſmall heapes, and afterwards they diſperſe the ſame vpon the whole fielde, as is accuſtomed in the common manner of dunging. And this marle will keepe the ground whereon it is laide, ſome 10. or 12 yeares in hart, and in ſome countries for 30. yeares. And ſometimes the vaine thereof, beginneth at the verie entrance of the pit, and ſo runneth down many yardes deepe: and ſometime we are forced to digge eight or ten yardes before we can come to the vaine thereof. But one thinge amongeſt the reſt ſeemeth moſt ſtrange of all other (which I haue heard ſome men maintaine) that it profiteth the ground very little, the firſt yeare wherein it is laid abroad, and that by reaſon of his exceeding heat, whereby it burneth vppe the ſeede that is then ſowne. But this is eaſilie anſwered, for that in the groundes bordering vppon the woods of Arden, which are verie colde, they vſe lime in ſtead of dung, and thereby they make ỹ earth moſt fruitfull which was barren before, Now if lime (which is nothing elſe but a baked or burnt ſtone within thoſe fierie furnaces, and whoſe moiſture is altogether exhaled, ſo as there remaineth therin nothing elſe, but the terreſtriall parts repleniſhed with a fierie vertue) be found ſo rich a ſoile, I know not why the heat of marle may not much better be endured. But it is verie requiſite to ſpread the ſame vppon the earth before the winter begin, to the ende that the froſtie weather may the better diſſolue the ſame.

A practicall diſcourſe vpon Marle

There is ſome Marle that is as white as lime, and

Diuers colours of Marle.

other some that is of a gray or russet colour, some of it is blacke, and some is yellowe. The cause of the white marle proceedeth of his long decoction, that which is blacke may haue many causes, whereof the principall is, that there is not any long time past since the matter thereof began to congeale, and this marle is more easie of solution, and peraduenture some putrified wood, or some minerals, haue turned the matter into a blacke colour. And as for the yellow marle, that colour may happen either of some yron mine, or of some mine of Lead, siluer, or Antimonie, and thus you see the reason of the diuersitie of colours that happen to marle.

That Marle is not hote

Marle is no other thing then a kind of clay ground and therefore seeing clay is cold and dry, as it appeareth by the Marcasites, and by wood that is both metalized and petrified in clay groundes, it is manifest that Marle is also cold and drie, and therefore it is not the heat thereof, which bettereth or amendeth barren grounds.

The beginning of Marle with the transumtation thereof

All Marle was earth before it became marle, it is a kinde of clay ground, and chalke it selfe was marle before it became chalke. And that which is more, that which is yet chalke within the Matrix of the earth, wil in time harden into a white stone. And last of all, whersoeuer there bee any stones that be subiect to calcination, they were firste marle before they were stones, for otherwise by their calcination they could not posibly amend any barren grounds.

Marle to be dissolued by frosts.

When Marle hath once begun to passe his decoction, it becommeth so harde, that the raine cannot dissolue it so soon as wee would haue it, but it remayneth in small peeces vpon the ground vndissolued, & hereby it commeth to passe, that it can impart none

of

of his ſtrength vnto the grounde vntill it bee melted and liquified, and for that this cannot be ſuddenly performed as in the firſt yeare, therefore the froſts in ſome reaſonable time after do cauſe a diſſolution thereof, and then it helpeth toward the generation & germination of all ſeeds, that ſhall be preſented vnto it. Alſo chalke and lime, after the froſtes haue taken them, wherby they crumble into powder, do become good marle, and ſerue in ſtead thereof.

How Marle worketh his effects.

Although I would not haue the generatiue vertue of marle attributed to his heat, yet my meaning is not thereby to rob Marle of his heat: but I labour to confute the fooliſh opinion of thoſe, which attribute the whole vertue thereof to his heate, I ſay the vvhole both inwarde and outwarde. For it is well knowne, that ſalt is inwardlie hot, and therefore it is accounted an helpe to the act of generation, and alwaies in extreame cold weather, a man ſhal finde ſalt to be as cold as water, or any ſtone. Wherupon we may eaſilie gather, that his heat could actuate nothing, vnleſſe it were firſt ſtirred vp by a counter-heate wherin conſiſteth the ſeminall acte, and therefore wee muſt reaſon more deeplie, and looke to the eſſential cauſe that moueth and worketh herein, and then wee ſhall finde out ſome hidden matter that is not ſubiect to euerie meane conceit.

A fift element and what it is.

And this is a fift element (neuer known before to the auncient Philoſophers) which is a generatiue water, cleer, ſubtile, mingled inſeparably with other waters, which water beeing alſo brought among common waters, doth indurate and congeale it ſelf with ſuch thinges as doo happen to bee mixed with it. And although the common Waters doe mount aloft againe by the attraction of the Sunne, whether that the ſame bee in Clowdes, Exhalations,

or

or vapors, yet neuertheleſſe the ſecond water which I call a fift element is alſo carried amidſt the others, and when thoſe common waters run downewardes, alongſt the vallies, whether they be flouds, riuers, or ſprings, I ſay that in what ſort ſoeuer they deſcende, or in what place ſoeuer they ſtaie, they doo alwaies frame ſome one thing or other, and moſt commonly either great ſtones, rockes and quarries of ſtone, according to the groſeneſſe of the matter which is ſtained with it, and carrieth the forme of his molde wherin it reſteth, and this being ſo congealed, that common water is ſometimes drunke vp in the earth, and deſcendeth lower, or elſe it is drawne vpwardes, and doth vaniſh away in vapors and cloudes, leauing his companion behind, which he is not able to carry any longer, And thus is Marle engendred, for before it was marle, it was a certeine earth, into which both theſe waters had entred, and had repoſed themſelues for a certeine time: during which reſt, the generatiue water became congealed, and the vaporatiue water paſſed away, and was drawne vp from the other, and ſo the earth (wherein this congealed water did ſtaie) waxed hard, and became white by the vertue therof, being both wrought vp into one bodie, whereby it commeth to paſſe, that when this marle is ſcattered abroad, vpon the arable ground, the ſeede which is ſowen thereon, doth not take of the ſubſtance of this marle, to helpe his vegetation, but doth rather glut it ſelfe with this generatiue, and congelatiue water, which I call the fift element, which generatiue water being once conſumed by often ſowing of the ground the marle becommeth vnprofitable, as a ſign of ſome decoction finiſhed, the like is to be thought of all other dung and lime.

It

It is alſo to be noted, that the ſeed which is ſowne cannot make any attraction of this generatiue water, if the ſame were not alſo moiſtened with the common water. And that when the ground is moiſtned either with the raine, or deaw that falleth, the common water that deſcendeth, together with the generatiue, ſtayeth the haſtie congelation of the other, whereby it commeth to paſſe, that corne and other ſeedes doe keepe themſelues greene vntill their maturitie, and when they are ripe, and that their roote ceaſeth to drawe or drinke vp any more thereof, the exhalatiue water flyeth away, and the generatiue remaineth, and as the decoction in plants beginneth to perfect it ſelfe, ſo the colour alſo chaungeth, as it commeth to paſſe alſo in ſtones and al kinds of mettall. So as this fift element, although it be a water, & mingled with other waters, yet it is the ſame which doth vpholde both ſtrawe and hey, and al kindes of Trees and plants, yea euen men and beaſtes likewiſe, & of this generatiue ſubſtance, the verie bones both of man and beaſt, are hardned & framed in their kind. And euen as we ſee the pibble or flint ſtones which are formed and engendred of this congelatiue water, doe endure the ſtrength of fire, and are not conſumed therewith, but rather vitrified: ſo in like manner this fift and generatiue element being within ỹ ſtraw and hey cannot bee waſted away, for if thou dooeſt burne them, or any other Wood in the fire, all the cõmon water thereof will vaniſh into ſmoke, but this generatiue water, which hath ſuſtained, nouriſhed & encreaſed both the ſtraw and hey remaineth in their aſhes, and cannot bee conſumed, but turneth it ſelfe into glaſſe, being liquified in thoſe hot flaming furnaces, and the ſame ſo cleere and tranſparant, as the

The vſe of the exhalatiue water.

generatiue water it ſelfe was before this congelation. But there is nothing that more reſiſteth fire then the bones of diuers beaſtes, as I haue often prooued when I haue burned the bones of ſheepes feete, and ſo of egge-ſhelles, which is a manifeſt argument, that they haue drawne more abundantlie to themſelues, of this generatiue water then any other partes. And there is no doubt but there is great ſtore therof in the apple of the eie, which being continually moiſtened and accompanied with the other exhalatiue water, is kept from being hardened into the nature of a ſtone. Neither is there any kind of ſtone which in his principall form is not cleere, and white, and thoſe which be clowdie are ſo by accident, for that in their compoſition, there happened ſome earth or ſande to bee congealed or hardened with their firſt matter. Neuertheles, there is no ſtone ſo dark & obſcure, which by force of fire dooth not become tranſparent at the laſt, bicauſe that principall element whereof I haue ſpoken ſo much, maketh al things elſe become tranſparent and fyxed, as it is it ſelfe in his fyrſt beeing. This I haue written the rather to encourage thee to ſeeke out marle within thine owne inheritaunce, to enrich thy barren groundes, that they may yeelde their fruit aboundantlie in their ſeaſons. And in ſo dooing, thou ſhalt ſhewe thy ſelfe a good husbandman, and become a patterne to all thy ſlothful neighbours, whereby they ſhall bee forced to imitate thy good example.

How Marle was firſt found out.

Now concerning the fynding out of this marle, I thinke that thoſe which fyrſt happened vppon it, did not obteine this skil by any true theoricall imagination, but that by meere chaunce, they did fynde the ſame without any ſeeking, as peraduenture by the digging

digging of ſome Ditch or other trench, about their ground, and beeing forced to throwe vp that which they had digged vppon the bankes of their arable fyeldes adioyning, and fynding ſuch Corne as happened to be ſowne vpon theſe bankes, to bee more freſh and ranke then in any other part of the fyelde beſides, they proſecuted this good happe of theirs further the next yeare, and ſo ſpreade the ſame ouer the whole fyelde: and ſo by long experience, and in the ende they found the ſame much more profytable then any other dung, and ſome others peraduenture might happen vppon the ſame in ſeeking for ſprings, in like manner. Yet it is alwaies to be noted that this marle muſt fyrſt be diſſolued throughout the ground before the ſeed can make any attraction thereof vnto it ſelfe: euen as fleſh cannot purchaſe a defenſatiue againſt putrefaction by ſalt, vntill the ſalt bee melted and made liquid.

How men may ſearch for Marle.

But for the more eaſie fynding out of this marle, I thinke it neceſſarie that euerie man ſhoulde haue a long Auger or Percer, with ſeuerall large bittes which he may put on and take off at his pleaſure, and with theſe hee may ſearch at what depth hee will, in diuers places of his Lande, alwaies marking what ſeuerall vaines of earth he fyndeth in the bytte of the Augur, and of euerie ſeuerall earth which hee draweth vppe, he may make ſome triall vpon the ground, vnleſſe he can be aſſured by the whiteneſſe and hardneſſe thereof that he hath hit vppon the right Marle: for then he needeth not to proceede to any further Triall.

And hauing once found the vaine, hee may lay it open in ſuch ſort as may be moſt conuenient for the euacuating thereof. Nowe if there happen to bee

any quarrie of ſoft ſtone betweene him & the marle: he muſt firſte make his entrance thorough the ſtone with a piercing worme, and then hauing made waie, he may ſeeke further with his foreſaid Augur.

Dolors of Marle.

Marle for the moſt part is white, yet in diuers parts of Fraunce, there is both gray, blacke, and yellowe, and therefore we muſt not whollie reſt vpon the colours thereof, for theſe other colours may become white by a longer decoction, and as there is a white marle, ſo likewiſe there is a white clay, which I think will ſerue in ſteade of marle, eſpeciallie that fulling earth, wherewith the fullers vſe to ſcoure out oile out of their cloathes.

A white claie. Fullers earth

That Marle is not of a fatty nature

It is an erronious opinion, to thinke that Marle may be diſcerned by the feeling of the hands, as ſome doe holde, and that it is to bee knowne from other moulds by the fattines, or viſcouſnes therof, which is falſe, for if it were fatty, it would be impoſſible eyther for raine or froſt, to diſſolue the ſame, for all oylie thinges do reſiſt and ſtriue againſt water, yea wee ſee apparantly, that both clay & marle do help to ſcoure out all greaſie and oylie ſpots, as Fullers can well teſtifie, and if marle were of an oylie Nature, it woulde conſume in the fire, but if we make any proofe therof, we ſhall finde the ſame moſt violently to reſiſt the fyre.

And in the latter end of his Philoſophical abſtract, Maiſter *Barnard* concludeth thus, that marle is a naturall, and yet a diuine ſoile, beeing an enemie to all weedes that ſpring vppe of themſelues, and giueth a generatiue vertue to all Seedes that are ſowne vpon the ground by the labour of man, and heere endeth Maiſter *Barnard.*

A man would thinke that ſo learned a Theorick as this

this in a matter ſo generall, and neceſſarie for the Realme of Englande, ſo plawſible to worldly wittes, and ſet down in ſo plaine and familiar tearms, could neuer haue beene extant ſo manie yeares together with ſo little fruit, and profite vnto all our leane and barren groundes, as (for ought that I can ſee or heare) it hath beene hitherto, and ſo is like to continue, vnleſſe ſome ſtudious ſcholler, or other, will ſteppe foorth, and take our idle Farmers by the hand, and either leade them ouer ſhooes into one of Maiſter *Barnards* Mucke-heapes, or elſe by violence thruſt them into one of his Marle-pittes. For what eaſier courſe can poſſiblie bee directed by the Penne of anie Writer, then is heere deliuered for the finding out of Marle? Or what cheaper tooles coulde the witte of man deuiſe, then an hande, and a piercing Augur to ſearch into the bowels of the earth for all her marrow, and fatneſſe? Doe wee thinke that Nature is bounde to caſt vp the treaſures of her full gorge amongeſt vs, who will not vouchſafe one pipe of *Tabacco* vpon her? *Effodiuntur opes*, ſayeth *Ouid*, vnto all flouthfull husbandmen, and therefore ſeeing wee may haue ſuch wealth for the digging, let vs not ſpare the Shouell and Mattocke, till wee haue founde out ſome Marle-pittes in our owne demeſnes. For the veynes of Marle are more in number, much longer and broader, and deeper than wee thinke for, and though wee finde them not in one place, yet wee ſhall happilie finde them in another. It is a ſmall aduenture to hazarde a ſhilling to gaine a pounde: it is no loſſe to ſet poore men on woorke, (which otherwiſe in conſcience wee beeing able, and they beeing honeſt, we are bounde to relieue) though they gaine vs nothing, our great poſſibilitie

Howe to find out Marle and the vſe thereof.

may easilie counteruaile their small charge. Regarde not the colours of the mould, you see that maister *Barnard* heere telleth you of a white, of a gray, of a blacke, and a yellowe Marle. And whie may there not also bee some other colours of Marle in our Countrey which Maister *Barnard* neuer knew? It is a small matter to trie the seuerall natures of all the veynes which you finde in digging, you may prooue of euerie kinde a little, in diuerse places the first yeare, and so proceede to a greater tryall the next yeare, as your good successe shall encourage you.

Colors of Marle.

And though you finde but small amendment in the first proofe, yet practize againe, for it may bee you layde either too little, or too much thereof vpon your ground: for too little of the best Marle can doe but little good, and too much therof hath beene alreadie founde to bee verie hurtfull to the Corne. And therefore vntill you haue attayned vnto the verie pricke of proportion, learne first all the experience which you can drawe from other men, and then prooue what further perfection you can adde thereto your selfe. Examine the seasons of the yeere, in which it is best to lay abroade euerie kinde of soile, for if the same bee of an harde and binding nature, then Maister *Barnard* telleth you, that it muste bee layde in the beginning of Winter, that first the frosts maie make the same to moulder into small peeces, and so to become apt for solution, and then the raine which commonly dooth fall more aboundantlie in the Winter then in the Sommer time, may perfectlie dissolue the same. If it agree not with one sort of soyle, peraduenture it will agree with another. It may

Proportion of Marle.

Season to lay marle abroad.

Vpon seueral grounds

may ſerue an arable grounde, and not a paſture ground, or a fennie, and not an heathie, or a Clay ground, and not a ſandie ground. Peraduenture it may proue good for one kinde of graine, and not for another. And therefore you muſt neuer reſt till you haue made a full tryall of all the inward veynes of the earth, in all the ſeaſons of the yeare, in all degrees of proportion, in all kindes of graine, vpon all ſortes of grounde, with all ſuch like neceſſarie circumſtaunces, and ſo in the ende you ſhall finde out thoſe differences, and make ſuch obſeruations to your ſelfe, as the ſlugguiſh and idle loyterers of our time (though they haue the ſame matter to worke vpon) ſhall neuer bee able to reach vnto, or imitate.

In ſeuerall ſorts of graine. Circumſtances.

Fullers earth.

The Fullers earth which Maſter *Barnard* heere mentioneth in his title of Marle, and commendeth to the ſame ende, I haue not knowne at anie time practiſed in Englande for the bettering of anie ground, but by all preſumption the ſame muſte of neceſſitie bee verie rich, becauſe it is full of that vegetatiue ſalt, ſo highlie commended by this French Authour, which appeareth in thoſe ſcowring effectes, for the which it is diuerſe wayes had in vſe amongſt vs, and if the ſame bee to bee had in anie plentifull maner, I coulde wiſh that ſome exact prooſe were made thereof, according to the former circumſtaunces. And heere I can not omitte the carefull induſtrie of that ingenious, though vnlearned olde man. Who hauing long ſince cutte off that vnprofitable exchaunge of our Engliſh ſiluer, with thoſe French and Leaden trifles: hath alſo giuen himſelfe to diuerſe other profitable and ingenious practiſes, amongſt

amongst the which he hath assured me of this one to be most true, that euen the very clay which he digged vp in Saint Georges fields, beeing laid vppon his pasture grounds which hee there holdeth by lease, did exceedinglie enrich the same, insomuch as hee did neuer regard to seeke after anie other soyle. And this hath also some credite with master *Barnard*, which affirmeth that all Marle is a kinde of Clay grounde, and it should seeme to differ onely in digestion from Marle. And in another place hee setteth downe his opinion of a white Clay, which hee found as hee trauelled in France toward Poicters, and Towers, that he held the same to be equiualent to Marle it self. And it should seeme by all reason, that the like order is to be vsed therein in bestowing it vpon the ground, as is before expressed in Marle.

Clay instead of Marle.

I may not here omit to commend the soyle of the streetes, or residence, and groundes of all Channels, Pondes, Pooles, Riuers, and Ditches, and of all other pannes and bottomes whatsoeuer, where anie store of waters do repose themselues, but especially where any abundaunce of raine water hath a long time setled, for that the congelatiue partes of these waters, bee full of the vegetatiue salt of Nature, as Master *Barnard* noteth, who is verily perswaded that there is no other reason to bee giuen of that heartie fruitfulnesse, which the fallowe groundes doe gather againe in time, but onely the generatiue part of raine water, which dooth fall vpon them so often, whilest they remaine vnsowen with graine. For to imagine that the earth by quietnesse or rest alone, should become fatte againe without the ministring of anie other nourishment or foode vnto it, were as much agaynst all sense and reason, as to thinke that a languishing

The soile of the streats, and the residence of all watrie bottomes.

ſhing patiente ſhoulde in tyme recouer his former ſtrength by keeping of his bedde only without taking of any cordiall or reſtoritiue broths for his comfort. Wherefore ſeeing there be ſo many pannes, and receptacles for waters in euery ſhire, in one place, or other, and ſeeing nature alone miniſtreth matter enough for vs to worke on, but wanteth handes onely to bring things together, let vs ſeeke to helpe nature a little with our hands, and ſhe will retourne our labour againe with an exceſſiue vſurie into our boſomes.

Mooriſh earth.

There is alſo a kind of mooriſh earth, which being laid after 20. or 30. loades vpon an acre, will amend, and better your paſture grounds a long time after.

Dung of beaſtes.

I will paſſe ouer all the triuiall vſes of Cow-dung, Horſe dung, folding of ſheepe, Hogs dung, Pigeons dung, and ſuch like, for that they are already knowne, and common in this land with euery Country *Coridon*, yet I thinke it not amiſſe to ſet dowe ſome neceſſary obſeruations in them, ſuch as I haue partely drawne from conceipted wits, and partely haue imagined my ſelfe by the contemplation of natures workes. And therfore here I can by no meanes allow of the ordenary manner, in laying abroade of our greate muckheapes, wherein Maiſter *Barnard* telleth vs that the winter raine which falleth vppon them, carieth alſo with it a greate parte of their ſtrength, ſo as the vpper parte of them becommeth very leane, and hungry, and is ſcarſely worth the cariage, and ſpreading abroad. But I knowe that the Farmers of our land will aunſwere me in this point, that it is too coſtly to build barnes, or other couerts for dunghills, but my meaning is not to perſwade them thereto (although peraduenture if wee did erect a fewe ſtreight trees, or firpoles, and make a looſe thatched, or bor-

Muckheaps how to be made.

A couert for a muckheape.

ded cap to couer it, which might slip vp and down at what heigth we thought good, as they vse in the low Countries to make their barnes, (a patterne whereof standeth to be seene nere vnto S. *Albones* not far from Parkmill, in the backeside of one of my tennaunts howses there) that so the goodnes of the soile would in a few yeares counteruaile the charge of our building) but rather that they woulde place the muckheapes vpon the foote of some hill (making a little square receptacle of bricke in the bottome thereof) whereby all such strength, and substance of the dung, as all the showers of raine that fal, shal carry with thē, might with a free discent be conueied into this pit or cesterne, so as the same in conuenient leisure mighte also with scoopes, and other shouels, be continually returned vpon the muckheapes from time to time as it fell, whereby the greatest parte of that vegetatiue salt, which nowe is loste in euery farmors yarde or backside, might be preserued for the better manuring of the ground.

A receptacle of brick,

Some be also of opinion that it helpeth much to the bettering of our dung, if al the brine and powdred beefe broth which is commonly throwne away, were powred vpon the muckheapes, thereby to multiply their salte. And Maister *Barnabe Googe* will haue all the suddes of his landery conueied thereon, and the muckheapes to be couered with bowes, to the ende that the Sunne may not draw away any parte of the strength thereof. And becauſe we are now entred into the most principall, & generall practise of this land whereby the greatest parte both of our pasture, and arrable grounds are vsually bettered; it shall not bee amisse to sette downe some new, though a very easie course, howe wee may the sooner bringe our dung to putri-

How to rot dung speedily.

putrifaction, and ſo thereby not onely obtaine ſuch ranke paſture as now we haue by reaſon of the ſame ſoile, but alſo that we may purchaſe a much ſweeter graſſe, or feeding for our cattell, then hitherto wee haue had, for that (as I conceiue) is the ſpeciall fault of the firſt crop which our ground bringeth forth after it is newly dunged. And this common errour of ours (if I be not deceiued) is eaſilie helped, & that only by making, firſt a lay of dung of a foot in thickneſſe, & then a lay of earth vpon the ſame, and then another lay of dung vpon that earth, and ſo proceeding in the maner of *Stratum ſuper ſtratum*, til your muck heape bee as large and high as you woulde haue it.

To haue ſweete gras at the firſte yeares dunging.

But this practiſe woulde alwaies bee perfourmed, either vpon the ground which wee meane to enrich, or very neere vnto it, leaſt that which we get in the goodneſſe of the graſſe, we doo happilie looſe in the charge of our labour, and cariage. And heere it ſhall not be altogether vnprofitable, to let all thoſe Gentlemen and Farmors, who are deſirous of ſome ſpeciall good mould, for ſome ſmall purpoſes, to vnderſtand, that after they haue disburdened ỹ ground of this great muckheape of theirs, that if they will yet digge a foot and a halfe or two foot vnder the ſame, that by this meanes they ſhal obtaine a moſt fat and rich earth, and very apt for diuers plants, as al our ordinary Gardeners, can ſufficiently witneſſe.

A rich molde for gardens, & orchards.

Thus much of the ſoile or dung it ſelfe, being diſperſed in his groſſe body. Now a worde or two of thoſe conceited practiſes, which I promiſed before. I haue heard ſom ſtudious practiſers very cõfidently affirm, that if you ſteep your corn in water ỹ ſpace of certein houres (but I could neuer yet finde them all agree in on time: for ſom limit 12. houres, ſom 18. & ſom 36. houres, you may proue them all, and keepe the beſt)

Of ſteeping corne in dung water

in water wherein good ſtore of Cow dung hath lyen in imbibition, for certaine daies (which times you muſt alſo ſerch, if you meane to be an exact maiſter) euery day ſtirring the ſame once, or twiſe together before you lay in your corne, and after this preperation you ſowe the ſame (though in barren grounds) that ſo you ſhall purchaſe a moſt rich, and plentifull crop with an eaſie charge. But this kinde of practiſe I haue heard both maintained, and impugned aſwel by reaſon as by experience, and that by men of good iudgement on both ſides, although if I woulde ſette downe mine owne experience herein, I muſt needes confeſſe I could neuer yet attaine to any truth in this ſecret, or to make any apparant difference betweene the corne that was husbanded in this maner, & that which grew of it ſelfe without any ſuch helpe, yet will I not (for the credit of the Reporters) altogether diſcredit the inuention, for that peraduenture I mighte faile in the nature of the graine, or in the time of imbibition. And as it ſhould ſeem great ſtore of thoſe vſuall receipts, which are common in our ordenary books of ſecrets, is drawne from this ground, wherby they labour to alter, and change the ſmells, taſtes, colors, and vertues of many fruits and plants, only by ſteeping the ſeeds in ſuch Aromatical waters, as they themſelues apropriate for ſuch vſes, as they entende them, & therfore they tell vs, that ſteeping of ſeeds in the infuſion of wormewood, centuary, coloquintida, and ſuch like, will defende them from wormeating, which for the preſent time I do eaſily beleue, but how then commeth it to paſſe, that theſe ſeeds do not alſo bring forth bitter fruite, according to their infuſion? and yet it is generally thoughte that the cloue-gilliflower gotte his firſte ſent from the cloue, which

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was conueyed into his ſlip, but this I holde for an erronious opinion, and to bee as falſe as it is olde, for neither is there any phyloſophicall, and inſeparable combining of their two natures, perfourmed in this groſſe practiſe; neither can ſo ſmall a ſubſtance (beeing neither truely prepared, nor exalted before) extend it ſelfe ſo infinitely from one ſlip to another, as we ſee daily perfourmed, in that ſweet and beawtiful flower.

I haue here yet one experience more to ſet down in this kinde, which (becauſe it was the practiſe of a ſpiritual Lord, that died of late, and fell out very happilie, as I haue beene credibly enformed by one of his eſpeciall officers, who with diuers others was an eiewitneſſe of the ſame: although it vary not much from the former courſe,) I wil publiſh the ſame vnto al poſteritie, vnder ſuch credite, as I my ſelfe did firſt receiue it. And therefore, whereas before you ſteeped your corne in the water, which had ſucked out the ſtrength, or ſalt of the dung, you muſt nowe mingle your dung, your water, and your corne together, in a great veſſell of wood, and you muſt ſtirre the ſame well, with an apte ſtaffe for the purpoſe, one whole houre at the leaſt: This worke you may begin in the after noone, and toward Euening you muſt recontinue your firſt agitation for one halfe houre, or more: then let theſe ſubſtances repoſe themſelues all the night following, and in the morning, or ſometime the next day, you muſt ſuffer the water to paſſe away by ſome tampion, according to the manner of the ſaltpeter men: & when the liquor is ſufficiently dreined, then mingle the corne and dung throughly wel together, and after ſow the dung and corne ſo mixed in a barren and hungry mould, and you ſhall haue as

rich a crop, as if the groud it ſelfe had beene dunged before. This experience was made, in an hartleſſe peece of ground, which lacked alſo one tilth, and which no man durſt aduenture to ſow with any grain and yet my Lord biſhop did by this meanes, attaine to a moſt plentifull wheat harueſt.

A practical diſcours vp on ſalt.

Now let vs proceed to the ſweeteſt, cheapeſt, and moſte philoſophicall marle of all other, euen that which both *Valetius* and maiſter *Barnard* haue ſo cloſely, and theoricallie handled, as that (notwithſtanding the one telleth vs of the exceeding fertillity, that is found in ſalt waters, by that infinite generation and multiplication of fiſhes, yea of Venus her ſelfe, that *Primum mobile*, in the procreation of children, and the other of thoſe pleaſant grapes, growing in the ſalt Mariſhes of *Xaintoigne*) yet neither of them haue left vs any aſſured meanes, how wee may purchaſe any ſtore of this ſalt, whereby wee may make any great vſe thereof. So as notwithſtanding we are now brought vnto the riuers of life, and to that goodly tree ſo laden with golden apples, yet here wee are left with *Tantalus* to ſtarue and periſh for want of food. Yea maiſter *Barnard* himſelfe, after that hee had ſo ſweetlie ſeaſoned our eares with his brackiſhe philoſophy, yet in one place (as if hee had repented himſelfe of his too much forwardneſſe, in theſe his ſecret diſcoueries, nay, as if he had the greateſt ſecret of nature in hand) he telleth vs in plaine termes, that it is not the common ſalt, but the vegetatiue ſalt, which he ſo commendeth. Nay, that which is more, in the examination of the Indges cenſure, vpon the groundes of condemned perſons, wherin they would haue their landes to be ſowed with ſalt, in token of a prepetual barrenneſſe, he faltreth and ſtaggereth, and

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can finde no reaſon to maintaine their iudgementes, vnleſſe it were as he ſaith, in reſpect of the nature of ſome countries, where ſalt was an enemie to al ſeeds. Why how now maiſter *Barnard*? Is it poſſible, that you, which could firſt find out the meanes, howe to furniſh vs in al places, with new ſprings of ſweet and delicate waters, where there was neuer any before, that could firſt finde a fift element, which nature had hitherto locked vp in her owne cofers, which coulde teach vs the reaſon of al petrefiyng, vitrifying,& metalizing of earthy bodies, yea which could ſo learned lie ſet downe, the generatiue reaſon of al vegetables, ſhould now be ignorant howe to reconcile earth and ſalt togither: or how to turn a common ſalt into a vegetatiue ſalt? Yet *Valetius* dealeth more plainely with vs (according to that light which hee had receiued) ſaying, that if too much or too little, doe in any one thing make an apparãt differẽce in ẏ effects, then ſurely of al others, the ſame is moſt eſpecially to be ſeene in ſalt; and ſo he would haue the curſed effects of that ſentence, to proceede from the exceſſiue proportion & quantity of ſalt, that is beſtowed vpon the malefactors grounds. But ſuppoſe that *Valetius* hath not only aimed faire like a gẽtlemã; but alſo hit the mark, like a a good archer in this point: wher is now this vegetatiue ſalt become, which M. *Barnard* ſo highly extolleth? or how ſhal we obtaine any ſtore thereof, for the enriching of ſo many thouſand acres of barrẽ groũd, as this realm of England doth preſent vnto vs? Meethinks I am now in the midſt of a ſtop galiard,& were it not, that I ſhould heere offend ſo great a concourſe of people, as I haue nowe gathered together, in mine owne conceit, *I* coulde finde in my hearte to commaunde the Violands to ceaſe, and ſo to breake off

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in the midst of a rough Cinquepasse. Neuertheles, craving pardon of all the ancient Philosophers heerin, but especially of M. *Barnard* (who if he had bin disposed, could haue eased me of this labour, & performed it much better) I will onely request with *Sinon*, *Fas mihi Graiorum sacrata resoluere iura*, and so bestow a new taske vpon Nature, who wil be ready to yeeld vs great store of the richest Marle-pittes, and such as haue not hitherto beene discouered, but onelie in phylosophicall tearmes to any Nation, or countrie whatsoeuer: hoping hereby, that as the secret which I haue now in hand, and seemeth almost incredible before it be disclosed, shall procure some further credite & beleefe, vnto the rest of my inuentions, wherof I haue alreadie giuen a taste, by a publique impression, and yet reserue some fewe till I finde a better opinion conceiued of English Artists.

Now then let vs first examine, what essential difference we can finde, in those foure elements, whereof all the inferiour bodies doo consist? or whether they may be all reduced to one, notwithstanding the manifest opposition that seemeth to be in their contrary qualities? And for my part, I must here acknowledge that the best naturall phylosophie that euer I coulde learne in this point, was neither out of Aristotles phisicks, nor Velcuries naturall philosophy, nor *Garsceus* meteors, nor out of any of the olde philosophicall Fathers, that writ so many hundred yeares past; but that little which I haue, I gathered it on the backside of Moore fieldes, where by sundrie vndoubted argumentes, I did heare it maintained, that all those elements, doo onely differ in attenuation, and condensation: so as earth beeing attenuated, becommeth water; and water condensate, becommeth earth;

water

water attenuated beecommeth aier, and aier condenſate beecommeth water; and ſo likewiſe aier attenuated becommeth fire, and fire condenſate becommeth aier, and thus all of them ſpring from one roote, which being admitted is a manifeſte prooſe that there is a greate, and neere affinity betweene the lande, and the ſea, wherein we ſhall finde ſalte water enough for our purppoſe. And yet further wee ſee that of the earth, and water together are made one globe, ſo as a ſmale matter will make them frendes being ſo neerely vnited together. And nowe I may well ſay that I am entred into an whole ſea of matter, from whence I muſte fetch the greateſt ſtore of my vegetatiue ſalte, and if this ſtore-houſe faile me, I knowe not whither to repaire for ſuch plenty of ſalte, as I muſt be forced to vſe in this action. And becauſe you ſhall vnderſtand that I am now in a right courſe, let vs conſider of a fewe experiences already performed in the like kinde; which becauſe at the firſte they were found out by meere chaunce, and not by iudgement, the Authors of them could as yet neuer extend them to any generall, or publique vſe: but haue hitherto walked continually like petite conſtables within their own precincts. Amongſt the which, the firſt practiſe that euer I heard of, was of a ſillie ſwaine whoe paſſing ouer an arme of the ſea with his ſeede corne in a ſacke, by miſchaunce at the landing, his ſacke fell into the water, and ſo his corne being lefte there til the next low water, became ſomewhat brackiſh, yet ſuch was the neceſſity of the man, asthat he (not withſtanding hee was out of all hope to haue any good ſucceſſe thereby, yet not being able to buie any other) beſtowed the ſame wheat vpon his plowed groundes, by the aduiſe of a gentle man of good

worſhip frō whence I receaued the report thereof, & in fine when the harueſt time came about, he reaped a rich crop of goodly wheat, ſuch as in that yeare not any of his neighbours had the like, & yet notwithſtāding (for ought that euer I could yet learne) neither he nor any other of his countrimē would euer aduenture to make any further vſe therof, beli:e being perſwaded, vnles that the corne by chaunce fell into the ſea, it would neuer fructifie. What ſhoulde I ſpeake here of him that of his owne mother witte ſowed a buſhell of ſalte long ſince vpon a ſmal patche of barren grounde at Clapham which to this daye remayneth more freſh and greene, and full of ſwarth then all the reſte of the fielde about it? But this man had ſome more reaſon then the other, not to proſecute ſo chargeable a practiſe any further, for that he knew well that one buſhell of ſalte woulde counteruayle two loodes of the beſte dunge there, whereas the former practicer, mighte haue had ſea water at will for the fetching.

Salt ſowed at Clapham

I mighte here adde the dayly, and vſuall practiſe in the Weſt partes of this land, where the people to their greate charge in cariage, doe conuaie the ſaltiſh ſandes, vnto their barren groundes, whereof ſome of them doe lye fiue miles diſtant from the Sea. And yet they finde the ſame exceeding profitable, for that their inheritance is thereby enriched for many years together, and who ſeeth not that the whole ſtrength, and vertue thereof conſiſteth in the ſalteneſſe, for otherwiſe wee mighte happely finde ſome other ſortes of ſand that woulde alſo bee equivalent vnto this. But to ſette downe one experience that may ſerue for a thowſand becauſe it conſiſteth

brackiſh ſandes.

of

of nothing els but ſalte. So that here is no partnerſhip at all, no ace of harts nor fiue fingers to bee ſuſpected.

Before you ſow your ground, do but only mingle two buſhels of bay ſalte, amongeſt foure buſhels of winter graine, and ſo diſperſe them together vppon the ground, and you ſhall finde a good encreaſe of corne and the land it ſelfe muche bettered, and cleered of weedes, as I haue beene very credibly enformed. But of all others I wonder moſte of all at the ordinary experience which hath ſo longe time in the view of ſo many perſons, beene yearely practiſed in the fieldes, neere adioyning to the ſalte pits of Nantwitch, where vpon the fall of any greate ſtore of land waters into their pits, being forced to empty, and drawe out all the freſh water which alwaies floteth vppon the brine, and to beſtow the ſame in ſuch places as are neereſt, and therewith alſo emptying ſome of the brine with the freſh water, they finde in time this earth ſo ſtrongly ſeaſoned with theſe brackiſh waters, that no ſoile or dunge is comparable vnto it, for the manurance of their groundes. And is it poſſible, that ſo many ſharpe, and choiſe wits, ſhoulde till this day neglect ſo rare, ſo rich, yea ſo meſtimable a triall as this, and not one amongeſt a thouſande that hath ridden from thence to Weſtcheſter, ſhuld haue beene able to haue caried the ſecret ſo farre, but muſt ſo careleſly, and retchleſlye drop the ſame by the way? But to com yet neerer to our purpoſe, what ſhall wee ſaye, or thinke of that ſurrounded leuell at Erith?

The brine of the Salt-pits.

Erith breaches.

I dare not report that exceeding fertilitie which I haue herd commended in thoſe two breaches, euen

by the ſeuerall farmers thereof: and though we may in ſome meaſure excuſe our groſſe capacities for not applying thoſe viſible effects of the brackiſh waters, which had many years togither, repoſed themſelues in the greater breach, becauſe the ſame was but lately inned, yet what ſhall we ſay for the leſſer breach, which hath bin woon ſo long ſince? Was it not ſufficient, to haue buried ſo many thouſands of our Engliſh pounds, in thoſe Dutch and drunken deuiſes, about the gaining of the grounde (in the time and charge whereof, ſome Engliſh wits that I coulde name, did offer to make a great and gainefull accurtation, and yet could not be heard) but that wheras nature her ſelfe preſented in thoſe breaches, a full recouerie of thoſe expenſes, to ſuch as are ſtudious; that yet we ſhould remaine as blinde as beetles, not once examining, from whence this aboundant fruitfulneſſe ſhould ſpring, or growe? Nowe *I* finde that ſaying of the Philoſopher, as concerning Nature, to be moſt true: That ſhe doth offer and diſcouer her ſelfe in the moſt plaine, and vſuall actions, wherein we doo daily buſie our ſelues, and yet ſcarcely any man doth apprehend her. The ſillie country wench, churneth creame into butter with a ſimple ſtaffe, and in a plaine veſſell, onely by ſtirring vppe the inwarde fire of nature in his owne center, whereby it maketh a true and philoſophical diuiſion of partes, yet whoe is the wiſer for it?

But to returne to our ſalt againe, and to giue ſome colour to this weake contemplation of ours, peraduenture ſome men (and thoſe alſo not of the meaneſt conceit) who hauing a continual eie vppon the ſalt marſhes, wher euery acre of ground is ſo little worth, do therefore vtterly condemne the vſe of brackiſh waters,

waters, as the waſtefull deſtroyers of all generatiue vertue. Indeed I know, and haue found it moſt true, in mine owne experience, that if any vegetable whatſoeuer, haue by miſhap taken any ſalt water, that the ſame is moſt vnapt to bee ſtirred vppe to any true or kindlie workemanſhippe, but the reaſon heereof, I muſt conceale for a time, it ſhall now ſuffice to aunſwer that other obiection, which ſeemeth like a force able ramme, to beat down al the foundation & building which we haue hitherto made. But this I may ſufficiently refell, by that *Nimium* of *Valetius*, which is daily to be ſeene in thoſe Marſhes, and maketh the graſſe thereof euen brackiſh, to al the cattel that feed thereon, although in the manifeſtation, and whole diſcouery of the ſecret which I haue in hande, the ſame is elſe-where, more fullie and plentifully aunſwered. What is then remaining, ſeeing that the ſalt of Clapham, thoſe Weſterne ſandes, that brine of the Cheſhire ſaltpittes, the reſidence of thoſe brackiſh Waters at Erith, doo offer ſo liuely demonſtration vnto vs of the vndoubted fertilitie, which is ready to ouerflowe our bankes if we wil but onely giue paſſage vnto it: but that wee doo nowe and than ſuffer a voluntary inundation and deluge, by thoſe brackiſh Waters of the Sea, vppon ſome parcel of land, that is adiacent thereunto? which after they haue ſufficiently repoſed themſelues thereon, we may by conuenient ſluces, returne the ſame againe, and ſo leaue the earth to her owne workemanſhippe, whoe by her inwarde heat and tranſmuting nature will in ſome reaſonable time, by way of putrifaction conuert that, which was before a common ſalt, into a vegetatiue ſalt, ſo as although wee had iuſt cauſe before, to feare the extreame drying, or burning na-

ture of ſalt, yet now when the ſame is made familiar, and as it were of one nature with the earth, it becommeth a moſt enriching ſubſtance: but leaſt (whilſt I go about to benefit the poore and honeſt Farmours of the land) I happen by theſe newe deuiſes, to hurt and hinder them againſt my will, and honeſt purpoſe; I woulde wiſh them firſte to conſider aduiſedlie of the whole diſcourſe, and to read it ouer againe and againe, before they put the ſame in practiſe, leaſt peraduenture, they take a ſword by the point, and ſo hurt themſelues by that weapon, which was giuen them to defend their perſons. And let this be a generall caueat vnto them, that they begin with ſmall practiſes, and firſt vppon arable groundes, before they proceed to paſture, or meddowe: and ſo beeing carefull in thoſe former circumſtances, which I haue handeled at large in the title of Marle, they ſhall no way endanger their eſtates, nor hazzard any great loſſe, before they attaine their deſires. Neither would I haue them perſwaded, that my meaning is that they ſhould ouerflow any groundes, which eyther they haue ſowed alreadie, or meane to ſow preſently with their graine, but rather ſome waſt ground or other, which after it hath beene g'utted with ſalt water diuers times, and then repoſed it ſelfe a ſufficient time, might ſerue in ſtead of marle, or other dung to ſpread abroad vpon their barren corne groundes; but how often the ſame ſhould bee ouerflowne, and in what time the earth will ſufficiently putrifie and tranſmute the ſalt, before it wil bee ſeruiceable in this kind, I wil not heere determine: yet ſince the ſame is ſo wel performed, neere the ſalt pits where there is not any artificiall obſeruation at al made, I think him to be of a very groſſe conceit, who after he hath conferred

ferred with thoſe of Nantwich in this behalfe, ſhould not be able to effect the like, in any parcel of land that bordereth vpon the Sea, or any arme thereof; yet it ſhal not be amiſſe for them to know this difference, that the brine of ſome of thoſe ſaltpits, dooth holde one third, or one fourth part of ſalt, whereas the Sea water dooth not for the moſt part containe aboue one eighteenth or twentith part of ſalt, which would make a great difference betweene them, but that much land water is alſo laded out of thoſe pits among the brine.

And now by this time I hope you are well furniſhed with ſalt, at an eaſie price, as alſo with the means howe to make the ſame of a vegetatiue nature. It were but in vaine here to entreat of the nature of that ſalt, whereof the Peter men doo gather a buſhell or two at the moſt, from thirtie tunnes of earth, & therfore howe excellent ſoeuer the ſame be in his kinde, it wil not profite vs much in this worke, becauſe the ſtore thereof is ſo little. Now I wil proceede to ſome other ſorts of ſoile, which be excellent in their kinde, but moſt of them appropriate only to particular places, and ſome of them not to be had in any great quãtity, and therefore fitter for gardens, or for the trial of maiſteries, then for the enriching of arable or paſture grounds, amongſt ẏ which, I wil alot the firſt place to the putrifaction of vegetables, becauſe there may ſome reaſonable ſtore be had of ſome of them, in certaine places, & then to the calcination of them, wher by they are firſt reduced to aſhes, & after thoſe aſhes may be diſperſed on ſuch barren grounds, as ẏ proprietors of them ſhal make beſt choiſe of. And for ought that I could yet imagine, I hold ẏ brakes or fern to be both the cheapeſt, yea moſt plentiful, and that which

may

may beſt be ſpared of all the vnneceſſary weedes that growe, and that you may ſooner rotte, and putrifie them, you muſt mingle good ſtore of earth amongſt them, or elſe make ſeuerall beds, or layes of earth, & ferne one vppon another; till you haue made as it were a large muckheape of them, and ſo let them reſt till they bee wholly conſumed into a fine earthe, or mold. Although I could name a Yorke-ſhire knight who dooth onely beſtowe the ferne it ſelfe in ſome good thickneſſe, throughout all the allies of his hop-garden, whereby both the rootes of his plants, are keept the moiſter, and alſo hee doth yeerely gather a rich molde out of his allies, to amende, and better his hop-hils withall.

How to putrifie ferne ſpeedily.

And here I haue iuſte cauſe offered me to commend alſo the manner of polling of his hops, which hee placeth in ſuch ſorte, as that one plant may not ſhaddow another: but that his whole garden receaueth the fulnes, & ſtrength of the ſun-beams at once, whereby both his hops are more kindly, and the bels of them much larger then in any other hop grounds, whoſe poles, are erected, and ſtand vpright after our ordenary and groſſe manner. But becauſe my promiſe was not, to deliuer any skil at al in hopgardens, I wil reſerue this concluſion, with ſome other ſecrets in hoppe grounds, not yet diſcouered or brought in publike vſe, for ſome apter occaſion, *vt ſemper nouus veniam.*

New māner of poling of hops.

And that *I* may not ſeeme, to haue loſt my ſelfe, in the midſt of theſe brakes, into the which I am now ſo deepely entred, I would haue that, which is heere ſpoken of the Ferne onely, to bee generallie vnderſtood of al ſortes of plantes, or vegetables whatſoeeuer, wherewith the earth dooth ſeeme vnprofitable

char

ged.

Diuers alſo haue found ſingular profit in the hayre that is gotten from the hides of beaſtes being thinly laid vpon the ground, and ſuffered to putrify. Haire.

Now as we may by putrifaction of the ferne, and other plants, in diuerſe partes of this realme make the ſame very profitable vnto vs for ſuch country purpoſes as are here intended; ſo likewiſe by calcination of them, or burning them to aſhes, we ſhall find the like and ſelfe ſame effects; as diuerſe ſhires in Englnd can already teſtifie in their owne experience, who conſume their ferne, ſtubble, ſtrawe, heath, furres, ſedge, beane ſtalkes, and ſometimes the very ſworde, and ſwarth of the ground to aſhes: and theſe according to the ſtore of ſalt, which their aſhes containe, do either for a longer, or a ſhorter time enrich their barren grounds. Caltinatia of vegetables.

And becauſe that nature may be knowne to bee ſo cunning an artiſt, as that ſhe hath not made any thing in vaine, the witte of man hath alſo founde out ſome good vſe this way, euen of the duſte and tailes of the malt, which are left in malting, for theſe being alſo returned vppon the grounds from whence they came do helpe in ſome meaſure to harten them again. The proportion of them is about three quarters to an acre of ground, but this ſecret extendeth only to malting towns, and there alſo but to a few acres of ground, yet I thought good to inſert the ſame among the reſt, as a member of that body, which giueth vn to each ſubiect his generatiue, and fructifying vertue. Malte duſt.

I would greatly commende that fine and delicate mold, that is founde in the boddies of olde large and hollow willow tres, that are putrified within, if it were as plentifull to bee had, as it is rich in ſubſtance, yet The earth in willow trees.

hapily how ſmall ỹ ſtore thereof be, it ſhal not be loſt for the gathering, after the beſt vſes thereof be found out, & known among ỹ ſtudious practiſers of our age.

And here becauſe of al other places, I woulde bee loth to leaue the moſt renowmed citty of Englande, wherin I was borne, without ſome further & ſweeter helps for her barren groundes, then ſhee hath bin hitherto acquainted withal, and for that I daily do ſee, a moſt rich commodity trampled vnder foot, and contemned of al men, I hold my ſelfe euen bound in conſcience, for my countries good, not to hide the ſame any longer, but rather to publiſh al ſuch profitable vſes therof, as I conceiue my ſelf, or haue learned of others, togither with a ful ſatisfaction of thoſe obiections, which haue bin grounded vpon the long diſcontinuance therof with the Low country men of Flanders, who are generallie accounted the moſt skilful & painful husbandmen of al Europe. The matter which I mean, is the waſt ſope aſhes which our ſope boilers for the moſt part, wil giue for the cariage, and ſom of them alſo doo pay for the cariage when they are conueyed from their houſes: though ſome fewe of them make a ſmal benefit of theſe aſhes. And here it ſhal be no ſhame for vs to acknowledg thoſe Flemmings to be our firſt teachers, in the vſe of them: naye, it is rather a great ſhame, that wee cannot bee prouoked to our owne profit, by the example of others, who haue ſo many years enriched themſelues therby, and haue of late yeares, to their great loſſe, bin forced to leaue them. As concerning their good opinion, and profitable vſe of them, I think wee need no further argument to maintain it, then the price which they gaue for them to the ſope-boilers, which I haue credibly heard, was 3.s. or ten grotes a lode, beſides ỹ carriage of them into their own countrey.

And

And yet if the infinite extenſion of them, the eaſie charge in beſtowing of them together with their eſpeciall nature, in ſuppreſſing of weedes, be wel weigh ed and conſidered, wee ſhall finde them to be much cheaper of that price then any common ſoile, or ſtable dung whatſoeuer. For howe cheap ſoeuer our other ſoile bee, yet the tranſpoſing thereof from place to place (if the land lie at any diſtance) doth make it ſo chargeable that the poorer ſorte of farmors in many places of this realme wil ſcarcely aford the cariage therof to their grounds, though they might haue the ſame freely giuen them; whereas two load of theſe aſhes or thereabouts being ſufficient for an acre of arable ground is ſoone beſtowed by the labor of one mã without the help either of cart or horſe. For their maner about Bridges was after they had ſowed the ſame with greine, to ſtrowe theſe aſhes thereon with their hands till the grounde did ſeeme to haue gathered a whitiſh garment vppon it, and that was ſufficient for that yeare, and by this practiſe they might ſowe the ground yearely without leauiug it fallow at any time; yea their ground being helped in this manner would yeald them a moſt rich crop of flax, whoſe ſeede of al other doth moſt burne, & pill the ground for ſo ſaith the Poet. *Vrit enim lini ſemen*. It is alſo with good probability to bee coniectured, that theſe ſope aſhes do not only enrich the ground, but do alſo help to deſtroy wormes, weedes, and ruſhes, that doe ſpring vp in moiſt and barren grounds; then let euery wiſe man imagine what may be ſaued thereby in that chargeable weeding of woad. *Qre* if brome or ferne may not be deſtroied by this meanes; and I make no doubt of brome, if the grounde were firſte plowed, and after theſe aſhes ſcattered vpon the ſame.

And becauſe I would not relie wholie vppon the outlandiſh experience of thoſe aſhes, (leaſt otherwiſe it might happilie be obiected that they are not agreeable with our ſoile or climate) I haue thought good to prefix in my demonſtratiue table, the portraiture of an eare of Summer barlie, beeing drawne truely and ſharpely, according to the breadth and length thereof; which together with ſundry others of the ſame proportion (as by diuers eie witneſſes of good credite, I can proue and iuſtifie) did grow this Summer at *Biſhops hall*, where I dwell; to the great admiration of the beholders: the ſtalke whereof together with the eare was meaſured to bee an ell, and three inches in length, from the ground to the ſummitie thereof. And this I did in a barren grounde, by the helpe and meanes of thoſe ſope aſhes, God bleſſing my labors therein.

I haue alſo this yeare, found the like ſucceſſe thereof in paſture ground, by the meanes aforeſaid. *Qre.* If that ſope aſhes wil not enrich the ground for woad as that thereby wee may continue our yeerely ſowing vpon the ground, without any intermiſſion thereof. *Qre.* Alſo, if the ſame be not very profitable to be laid amongeſt the hop hilles, to make the plantes to flouriſh and proſper the better. For in Lombardie, they like ſo well the vſe of aſhes, as that they eſteeme it much aboue any dung; thinking dung not meete to be vſed, for the vnholſomneſſe thereof. This out of maiſter *Barnabie Googe*, who dooth alſo affirme in another place of his booke of Husbandrie, that if we wil haue the Artichoke to proſper well, wee muſt dung the ſame continually with aſhes, for that kinde of fruit delighteth therein.

And to make the ſame out of all queſtion, I knowe

a graue and well experienced Cittizen of London, who hath made often triall of them, and hath founde very good ſucceſſe, by applying them in the Winter time, to the rootes of his owne Artichokes. Now if we will alſo looke into the reaſon hereof, we ſhal find it to be nothing elſe but the ſalt of theſe aſhes, which notwithſtanding al that ſharpe Lee, which the ſope-boilers haue drawne from them, do yet remain much ſtronger, and more ſaltiſh then our beſt aſhes, that haue not as yet beene put to any vſe; and this wil eaſilie appeare in ſome of thoſe other vſes, that followe hereafter. All which being well conſidered, I do hold the ſame better for winter then ſummer corne, and very profitable for al colde and moiſt paſture, & medow grounds, ſo as they be laide vppon them, about the feaſt of all Saintes, that the great ſhowers in the Winter time, may make them of an eaſie ſolution; whereby the graſſe may haue a more ſpeedy attraction of their vegetatiue ſalt vnto it.

Some be of opinion that theſe aſhes be made for the moſt part, of that tree which carrieth a ſmall leaf, like vnto our Oke, and whereof the Danſicke Wainſcot is made. And ſome others doo commend another tree, that ſomewhat reſembleth our Witchen Elmes, of whoſe boughes and branches, beeing burned, they gather theſe aſhes. But it is moſt certaine that they are not the aſhes of any one tree, but of diuers that are conſumed together, as they growe in ſome great wood. Nowe theſe aſhes by a more violent kind of fire, beeing forced to a fuſion, whereby they cake and clode together, are then called by the name of ſopeaſhes. But howe then commeth it to paſſe, if there be ſuch ſalt and ſtrength, remaining in theſe waſte aſhes, that our Fleminges (who wil not

loſe ſo much as the parings of their nayles, much les the vſe of ſo rich a commodity) ſhould wholy abandon them, and for ſo many yeares togeather diſcontinew all their traffike and barganing with our ſope boilers? It ſhould ſeeme by all likelyhood that though for a few of the firſt yeares they found ſome hartning therby vnto the ſoile and ground whereon they were beſtowed, yet in proceſſe of yeares that theſe aſhes being yearely renewed vpon the ſame land, did in the ende leaue ſome hard and barren cruſt, or *caput mortuum* behinde them, whereby the ground becam either for a long time, or wholy vnprofitale euer after.

Theſe obiections being throughly anſwered, and confuted, I hope I ſhall finde an eaſy ſute of it to entreat all our London borderers, who doe occupy themſelues in the affaires of husbandry, to ſtep into the dutch mens romes, and to neglecte no longer ſo rich and ſo bountifull an offer. Neither yet will I here relie vppon thoſe late troubles, and turmoiles of the low countries, which hath beene a meanes both to cut off a great parte of the entercourſe betwene them and vs, and to make them almoſte vnwilling to performe any proffitable practiſe for their owne good leaſt the enemy ſhould like a drone Bee deuoure their hony, nor yet vpon any newe exaction that hath ben demanded of them vppon the tranſporting thereof, whereas in times paſt they did cary them freely away for balliſt, but I will only at this time vrge that countermanding priuiledge firſte granted vpon a color or pretence to haue imploied them very profitablely vpon the making of ſalte peeter, and brimſtone within this realme, whereby al the ſope boilers were prohibited from the ſale of them to any ſuch as would tranſport thē, although the patentees could neuer as yet

with

with all their chimicall skill, draw out or ſeperate one pound of peter, or brimſtone from them. And for my parte I am vndoubtedly perſwaded that their firſt purpoſe was no other (howſoeuer the ſame was masked, or diſguiſed in ſhew) but only to force the ſope-boilers (after they had procured a generall reſtrainte) to growe to compoſition with them for ſetting them at large again, which appeared moſt manifeſtly to be ſo, for that in ẏend they demanded a certaine rate vpon the tun, which they denied, and therupon the firſt diſcontinuance of them grewe betwixt the flemings and the Sope boilers. And thus I hope I haue remoued this ſtumbling blocke out of my countrimens way whereby they may beginne a freſhe practiſe of them, and thereby make ſome vſe of that patent, which hath by this time gotten a ſownd ſleepe, and is now awaked in a good houre.

And as concerning any bad accidente that they ſhould in time leaue behinde them; their melting and ſoluble nature, whereby in one yeares ſpace they are wholy conſumed with thoſe ſhowers, and froſts that ouer take them, is a ſufficient argument to conuince all doubtes that can poſſibly bee obiected this way. But now to ſome other vſes of them: I do find them much better and cheaper then the maſons duſt for the ſcowring of our trenchers, and other wodden veſſels, and this can our duche liskins, and kitchin maides well approue, whoſe dreſſors, ſhelues, and molding bordes are muche whiter and cleaner keept, then thoſe which are waſhed, and ſcalded after the engliſh manner; vppon which reaſon they muſt of neceſſity be very ſeruiceable for waſhing of al our wodden floores either of deale, or elme to clenſe them of all their greaſe, ſpots, or ſoile whatſoeuer

and

and I make no queſtion but that we ſhall finde them very excellent for the ſcowring, and clenſing of our glaſſe windowes from all the ſteines, filth, and clowdineſſe, that maketh them in time ſo darkſome vnto vs. I will paſſe ouer the vſe of them in the pauing of the ſtreetes, and laying of bowling allies, wherin alſo many hundred loades are yearely conſumed in London, and the ſuburbs rounde about it. But I may not omitte that excellent and ingenious practiſe, of that skilfull and auncient ſopeboyler, who looking aduiſedly into their binding and knitting nature, hath to his greate credit erected a faire, a ſtrong and coſtly building of bricke, in the morter whereof, he beſtowed good ſtore of his owne ſopeaſhes, which to this day contineweth firme, and ſolid, and without any ſhew of ill accident (hapining by theſe aſhes) as any other building, whoſe ſtones were laide only with lime, and ſand. By whoſe good example many other alſo of latter times haue occupied many hũdredloads of them for the ſame purpoſe, & would haueſpent many thouſand loades of them ere this day, but that they finde this morter ſomewhat rough in the laying, and more ſharpe, and fretfull to their fingers then their vſuall morter which they daily occupy. But if I were able to be a builder my ſelfe, I woulde ſoone remedy theſe two ſlender falts, whereof the latter I holde rather for an excellent quality, and moſt appropriate for the nature of morter it ſelfe, rather then a falte. And yet for the good will which I beare vnto all the excellent vniforme builders of our time, and becauſe thereby I ſhall giue ſome encreaſe of labour to the poore, and painefull people, that may bee employed therin; I will ſet downe the beſte aduiſe, that I can in this behalfe, the ſame being ſuch as I dare make warrant

warrantiſe thereof vppon my credit, being carefully handled. As concerning the roughnes of them, who is ſo blind that ſeeth not which way to remedy ỳ ſam, for it is rather a worke of labor then of skill? For they being either groũd or ſtamped into a fine powder, before they be mixed with the ſand, wil ſoon be brought into a ſmooth temper.

And here wee haue no neede to feare the charge that will ariſe thereby, for I dare vndertake that the profit of one daies labour, will anſwere the charge of three mens wages, in the difference of price that will be found betweene one loade of theſe aſhes, and one hundred of lime. The ſharpnes wherwith they offend the Bricklaiers fingers may in ſome ſort bee auoided by wearing of gloues (without the which, they ſeldome lay any bricke at all) to auoide the like effects, which they finde in lyme. But for an aſſured helpe therein (if the ſame be ſuch as cannot bee endured of workemen) let theſe waſt aſhes bee reimbibed with more water for ſome reſonable time, till ſome farther part or proportion of their ſalt be deuided from them and then without all queſtion they ſhall finde them gentle enough, and much of their fretting nature taken from them. See the whole arte of making of the morter ſet downe in the former book of experiments *nu.* 92. The laſte, though not the leaſt vſe of theſe aſhes, which I purpoſe to diſcouer at this time, is to make them ſeruiceable in ſteade of common aſhes, both for the whiting of linnen, as alſo for the making of buck lee, which are nowe growne to an exceſſiue price, partly by the greate expence of them in ſalt peter works: but principally through our late ſparing of wood and charcoale, whereby theſe latter times doe not afford the like ſtore, or plenty of them as we were

For buck cloathes.

accuſtomed to haue in the daies of our predeceſſors. And I am ỹ rather induced to conceaue well of them in this courſe, by that auncient, and common experience, which the whitſters, and dutch laundreſſes haue long ſince begun, and doe as yet continew amongeſt vs, for the ſpeedier whiting of yarne with them, which they do moſt confidently affirme to become more white by this meanes by once bucking of it, then by ſundry times with our common and ordinary aſhes, and if they ſhalbe found ouer ſtrong, & ſharpe for our linnen (which is the only falte that I could euer here them charged withall) I doubte not but that by the aforeſaid manner of imbibition, they may be ſo weakned, as they ſhall eaſily be reduced to the perfect ſtrength of our ordenary aſhes: or elſe for our better ſatisfaction herein wee may vſe ſuch proportion of our aſhes amongſt them, as may beſt bring them to bee of one nature and qualitie with them. Thus much by way of digreſſion of the ſeuerall vſes of theſe waſt aſhes, wherein though I haue ſtrayed a little without the bondes, and limits of husbandry yet I hope I ſhalbe found ſufficiently within my text, for that all theſe particular vſes may ſeeme to maintaine and fortifie their fructifying nature the more, becauſe they are wholly drawn from that vegetatiue ſalt, wherwith the ſame aboue all other ordinary dung whatſoeuer is moſt fruitfull, and abounding.

Salt of Animals

Thus much of vegetables, nowe a touch of Animals, and ſo I will knit vp this diſcourſe, leauing thoſe ineſtimable and hidden treaſures of the minerals and their ſalts, tending alſo this way vnto the deeepe Lulliſts, and trew engliſh Paracelſians, who no doubt if they liued in thankfull times, woulde begin where I haue left, and not only haue publiſhed their philoſo-

Salt of Minerals.

phical

phicall ſalt, which nature ſhoulde haue beene forced to maintaine for euer, but wouldalſo haue laide open a verie large veine of golden Marle, whereby they woulde haue ſo multiplied that radicall moiſture of ſundry plantes, as that in ſome good meaſure they ſhould haue recouered that firſt perfection, wherein they were created, and which they loſt by the fal and diſobedience of man. I am crediblie enformed (and the reaſon thereof is ſo apparant, as that none but he which will deny the concluſion of a Syllogiſme can denie the ſame) that after ſuch time as the coaſt-men haue by expreſſion, and other apt means, gotten that kind of traine oyle, which they call a pilchard oyle, from the fiſh of that name, that they doo alſo beſtow that which remaineth of the pilchardes vppon their leane and hungry grounds, the ſubſtance wherof, by putrifaction, dooth in time become a moſt rich and fruitfull molde, and ſuch as giueth hart vnto ỹ earth, for many yeares together.

Pilchards putrified.

And it is no way to be doubted, but that the carcaſes and garbage of al other fiſh, would produce the like effects, for that they muſt of force reſemble the nature of the place wherin they breed and liue: wherof we ſhould haue had a ſufficient triall ear this, but that there is no ſuch ſtore of any other fiſhe ſo fitlie preſented vnto vs for this purpoſe, as the pilcharde, which ſerueth to no other vſe, after ſeparation made of the oile, but only to engender this ſalt dung, which we haue in hand.

Garbage of fiſh,

Now concerning the bloud, offal, and entrailes of beaſts, euery Butcher about London, who for the moſt part, hath a garden for that purpoſe, to burie the ſame in, to auoid offence, can ſufficiently teſtifie. And I haue heard the bloud of beaſts commended in high

Bloud, offal & entrailes of beaſtes.

high tearmes, for the forwarding and prospering of all poore and backward vines, so as withall it be tempered with lime, which is vsed to no other ende, but onely to destroy all such wormes, as otherwise the bloud would engender in the earth, which would in time consume all the sap and marrowe, that lyeth in the rootes, and in the end destroy both the root and the vine. Yet this caution I will giue before I conclude: that he which tempereth lime with ỳ bloud, must suffer the first accidentall heate, which happeneth in the slaking thereof, to passe ouer, before hee apply the same to the root, either of the vine, or of any other plant, least that vnkindly and vnnatural heat, (which for the time is stirred vp in the composition) do happen to burne and drie vppe, that radicall moysture, which will hardly be restored againe, by any outwarde Art or meanes whatsoeuer.

Claudite iam riuos pueri, sat prata biberunt.

Here endeth the booke *of Husbandry.*